

1. An instrument for curing light-curable compounds which are curable in the mouth of a patient, the instrument comprising:

a housing;

5 a plurality of solid state, light-emitting elements, the elements comprising semiconductor junctions and being mounted on a substrate supported by the housing to form a collective array on said substrate, the array of elements operable for collectively emitting light having wavelengths within a narrow band of wavelengths;

10 a generally clear layer simultaneously covering all of the plurality of light-emitting elements for protecting the array of semiconductor junctions;

an optically reflective element coupled to surround the plurality of light-emitting elements to capture the collective light from an array of light-emitting elements and direct it forwardly away from the collective array and ultimately to a compound for curing.

2. The instrument of claim 1 wherein said solid state elements are light emitting dies formed of a semiconductor material.

3. The instrument of claim 1 further comprising a heat sink thermally coupled to the substrate for absorbing heat generated by the array of elements.

4. The instrument of claim 1 further comprising a thermally conductive element which is thermally coupled to the substrate for conductively transferring heat generated by the array of elements away from the substrate.

5. The instrument of claim 1 further comprising a heat exchanger which is thermally coupled to the substrate for dissipating heat generated by the array of elements.

6. The instrument of claim 1 further comprising a first heat sink element thermally coupled to the substrate for absorbing heat generated by the array of elements, and a heat exchange element thermally coupled to the heat sink for conductively transferring heat generated by the array of elements.

7. The instrument of claim 1 wherein said housing comprises a barrel portion having a proximal end spaced from a distal end of the barrel portion, the distal end being configured to be placed in the mouth of a patient, the array of light-emitting elements being positioned proximate to said proximal
5 end, a light transmitting device being operably coupled to said array for transmitting the light beam from the array to the housing distal end.

8. The instrument of claim 7 wherein said light transmitting device comprises a plurality of fiber optic elements operably coupled together for directing said beam.
to the mouth of the patient.

9. The instrument of claim 1 further comprising a portable power supply positioned within said housing for portable operation of the instrument.

10. The instrument of claim 1 wherein said array of elements has a density of elements on the substrate operable for collectively emitting a power density of light in the range of 200 to 1400 mW/cm².

11. The instrument of claim 7 wherein said light transmitting device has an acceptance angle, said optical focusing device operable for generating a beam of light which does not diverge significantly from said acceptance angle.

12. The instrument of claim 11 wherein said array of light-emitting elements emits light in the range of 0° - 180° and said optical focusing device is operable for collimating the light into a beam which does not diverge significantly from said acceptance angle.